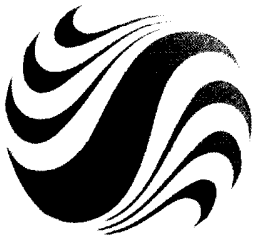
EASTSHORE ENERGY CENTER

STORM DRAIN CALCULATIONS



Stantec

370 NORTH WIGET LANE, SUITE 210
WALNUT CREEK, CA 94598
(925) 941-1400 FAX: (925) 941-1401

Job No. 2010091600

CALCULATION SHEET

Stantec

FILE _____ SHEET _____ OF _____

	PROCESS	JOB#	CALC#	PROJECT EAST SHORE ENERGY CENTER
	CIVIL			
	MECHAN.	MADE BY CS	DATE	SUBJECT STORM WATER RUN-OFF
	ELECT.			
	INSTR.	CHK BY	DATE	
	ARCH.			
		APP. BY	DATE	

DESIGN CRITERIA (TO BE VERIFIED IN FINAL DESIGN)

1. USE RATIONAL METHOD.
2. RAINFALL INTENSITY 2.4"/HOUR FOR TIME OF CONCENTRATION = 10 MINUTES.
3. RUNOFF COEFF. = 0.8 (ASPHALT & ROOF AREAS)
   = 0.6 (MAINLY GRAVEL AREAS)
4. FLOW NOMOGRAPH FOR MANNING FORMULA FOR CIRCULAR PIPES FLOWING FULL.

CALCULATION SHEET

Stantec

FILE _____ SHEET 1 OF _____

	PROCESS	JOB#	CALC#	PROJECT EASTSHORE ENERGY CENTER
	CIVIL			
	MECHAN.	MADE BY CS	DATE JULY '06	SUBJECT STORM WATER RUN-OFF
	ELECT.			
	INSTR.	CHK BY	DATE	
	ARCH.			
		APP. BY	DATE	

CHECK EXISTING 12" ϕ GRAVITY LINE FOR SITE STORM WATER RUN-OFF.

DESIGN FLOW

12" ϕ

SLOPE = 20.8' − 19.65'
= 1.15'

DISTANCE = 334'

S = 0.3%

FROM NOMOGRAPH

Q = 1.95 CFS = 875 GALLS/MIN.

V = 2.5 FT/SEC.

FLOWING FULL.

ACTUAL FLOW

USING RATIONAL METHOD,

Q = CiA

C = RUNOFF COEFF.
= 0.8.

Q = FLOW RATE IN FT³/SEC.

i = RAINFALL INTENSITY
= 2.4"/HOUR FOR T_c

303E - 11/05

CALCULATION SHEET

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FILE _____ SHEET 3 OF _____

	PROCESS	JOB#	CALC#	PROJECT EASTSHORE ENERGY CENTER
	CIVIL			
	MECHAN.	MADE BY CS	DATE	SUBJECT STORM WATER RUN-OFF
	ELECT.			
	INSTR.	CHK BY	DATE	
	ARCH.			
		APP. BY	DATE	

CONSIDER AREA DRAINING TO NEW SYSTEM

$= 160' \times 570' = 91,200$

$310' \times 260' = 80,600$

$207' \times 30' = 6,210$

$178,010$ SF

LESS $125 \times \frac{92}{2}$ $5,750$

$172,260$ SF

$= 3.95$ ACRES

AREA DRAINING TO EXISTING SYSTEM

$= 6.22$ ACRES $- 3.95$ ACRES

$= 2.27$ ACRES.

CALCULATION SHEET

Stantec

FILE _____ SHEET 4 OF _____

	PROCESS	JOB#	CALC#	PROJECT EAST SHORE ENERGY CENTER
	CIVIL			
	MECHAN.	MADE BY CS	DATE	SUBJECT STORM WATER RUN-OFF
	ELECT.			
	INSTR.	CHK BY	DATE	
	ARCH.			
		APP. BY	DATE	

NEW SYSTEM RUN-OFF

USE C = RUN-OFF COEFF.
= 0.6
(LARGE GRAVEL FINISH AREAS)

$Q = C \lambda A$

$= 0.6 \times 2.4 \times 3.95$

$= 5.69$ CFS

$= 2553$ GALL/MIN.

ASSUME GRAVITY FLOW TO CITY SEWER
= 875 GALL/MIN.

RETENTION BASIN CAPACITY FOR 20 MIN. STORM

$= (2553 - 875) \times 20$

$= 33,553$ GALL.

VOLUME $= 33,553 \times 0.1337$

$= 4486$ CF

USE BASIN $20' \times 40' \times 6'-0''$ DEEP

WERAGE

sewage backing up and sur-
ıed to run full, the hydraulic
ıe junction, and surcharging
a drop is made.
ant consideration in sewer
Experience indicates that a
equired in sanitary sewers in
olids. The minimum allow-
give this velocity when the
uld be used if they are prac-
lations of state health depart-
le slopes for sewers of various
a ity in the pipes of 2 ft.
3. Under special conditions
slopes slightly less than those
but in this case the engineer
lepth of the sewage at design
neter.
be required than in sanitary
it which will be washed into
2.5 ft. per sec., and 3 ft. per
character of the solids, exces-
ft. per sec. being considered
ıat limit, large and important
tions with vitrified-tile blocks

ty in obtaining the minimum
pipes because they will pro-
des. It should be recognized,
per sec. will be reached only
ill be noted in Fig. 15-5, pipes
ies less than when full or half
ow flows may make matters
is anticipated should be con-
actual velocity that will be
es that are too low for cleaning
be made for convenient and
to remove them should they
w far toward preventing

15-3 are nomograms for the
ious ranges of quantities and
e of the diagrams can best be

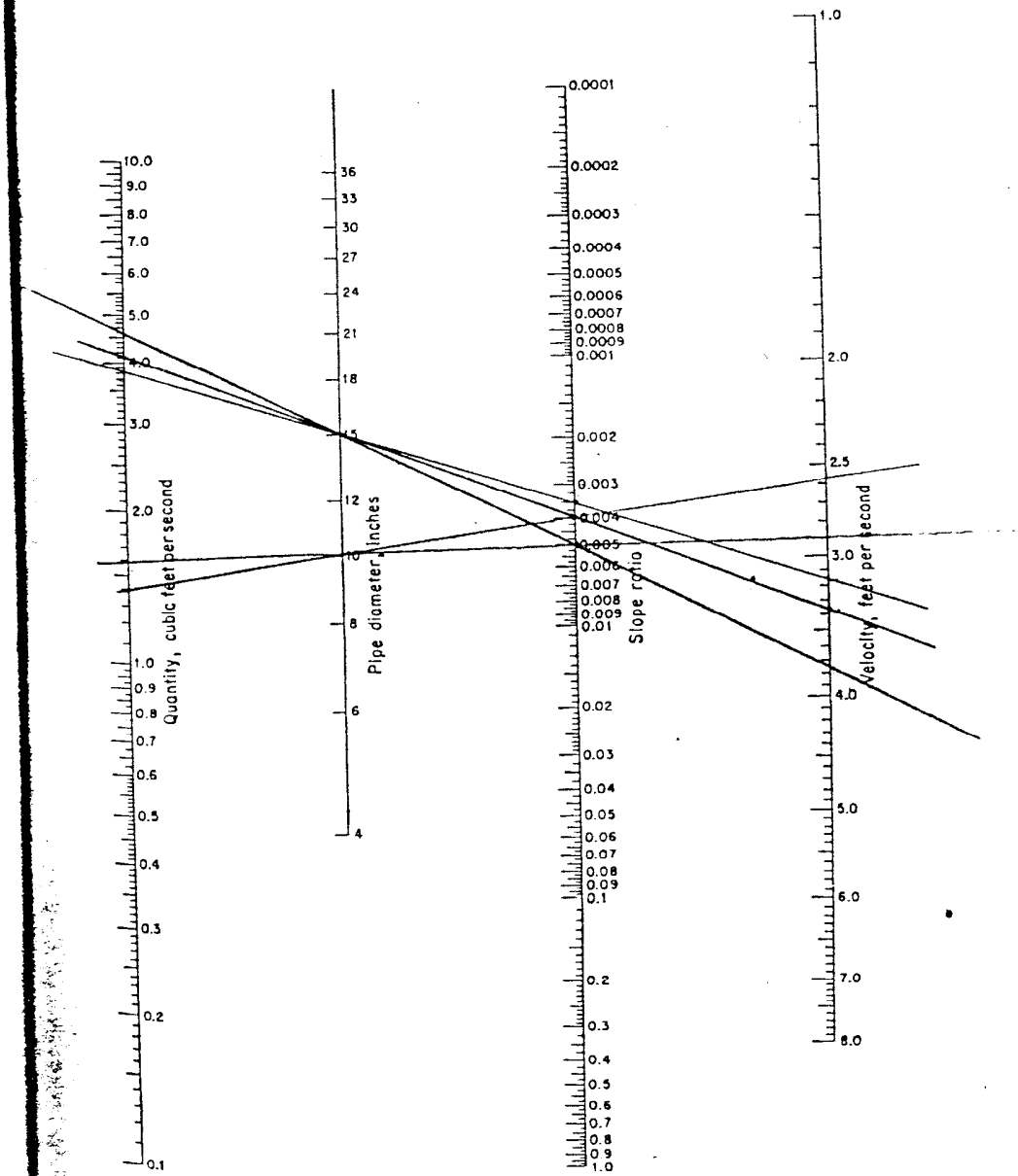

FIG. 15-1. Diagram for solution of Manning formula for circular pipes flowing full. $n = 0.013$.